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ABSTRACT

There were declines on achievement tests between 1972 and 1980. This study, the first part of A Study of High School Excellence, was designed to document changes in the achievement of high school seniors between 1972 and 1980, to identify the school and student factors related to these changes, and to examine the policy implications of the findings. Information on 1972 high school seniors and their schools comes from the National Center for Education Statistic's (NCES) National Longitudinal Study of the High School Senior Class of 1972. Data on 1980 high school seniors and their schools were drawn from a second NCES longitudinal study, High School and Beyond. Student achievement was measured by achievement tests in vocabulary, mathematics and reading administered to seniors at the time of the surveys. A "step down" analysis of covariance was used to estimate how 1972-1980 changes in population demographics, student behavior, school characteristics and home educational support system affected the average score decline. Findings suggested that the major factor contributing to test score decline was a decreased academic emphasis in the educational process. (JAZ)

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Changes in Student Achievement and Behaviors:

A Cross-sectional Analysis, 1972-1980

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Introduction

In 1983, eight major national studies reported on the status of public education in the United States. These reports sounded a common theme: The American educational system is in trouble. The major evidence cited in support of this claim was that academic achievement, as measured by performance on the College Board's Scholastic Aptitude Tests and the National Assessment of Educational Progress, had declined. This situation was attributed to demographic changes, lower standards, lower expectations for students, a less rigorous curriculum, and the poor academic preparation of new teachers. However, there is little systematic research that relates these factors to test score decline.

This project, the first part of A Study of High School Excellence funded by the National Center for Education Statistics (NCES), was designed to document changes in the achievement of high school seniors between 1972 and 1980, to identify the school and student factors related to these changes, and to examine the policy implications of the findings. Information on 1972 high school seniors and their schools comes from NCES' National Longitudinal Study of the High School Senior Class of 1972 (NLS-72), a stratified, national probability sample of over 21,000 seniors who attended 1200 public and private high schools. Data on 1980 high school seniors and their schools were drawn from a second NCES longitudinal study, High School and Beyond (HS&B), that surveyed approximately 28,000 seniors attending 1,015 private and public high schools. Student achievement is measured by achievement tests in vocabulary, mathematics and reading administered to seniors at the time of the surveys.

How Did American High School Seniors and Their Schools Change Between 1972 and 1980?

There were significant changes from 1972 to 1980 in the characteristics of high school seniors, their homes and families, the schools they attended, and their attitudes and behaviors.

Demographic Characteristics

The 1980 seniors were more likely to be members of a minority group and from the South than were the 1972 seniors. Females constituted a slightly larger proportion of the 1980 seniors than the 1972 seniors.

Minorities increased from 14.2 percent of 1972 high school seniors to 20.1 percent of 1980 high school seniors. The major increases were among Blacks and Mexican Americans. Blacks increased from 8.7 percent of all seniors to 11.6 percent; Mexican-Americans increased from 2.5 percent to 3.5 percent.

More seniors came from the South in 1980 than 1972 and fewer came from the Northeast. In 1972, 26.2 percent of all seniors came from the South; by 1980 this had increased to 30.4 percent. In 1972, 26.4 percent of all seniors came from the Northeast; by 1980 this had decreased to 22.9 percent.

Home and Family Characteristics

There were changes in parental occupation, parental education, and educational influences in the seniors' homes between 1972 and 1980.

There was a significant increase in the mean level of parental education from 1972 to 1980. By 1980, the percentage of seniors' fathers with some college education had increased six percentage points to 34 percent and the percentage of mothers with some college education had increased seven percentage points to 28 percent.

There was relatively little difference in fathers' occupations in 1972 and 1980. The large decline between 1972 and 1980 in the percentage of seniors reporting their mothers' occupation as homemaker is probably a confounding of the actual increase in women's participation in paid work and a change of phrasing in the mother's occupation question.

Mothers of 1980 senior women had higher educational aspirations for their daughters than did the mothers of 1972 senior women. Aspirations for senior men remained unchanged. In 1972, 62.4 percent of the male seniors and 51.7 percent of the female seniors reported that their mothers wanted them to obtain four or more years of college education. By 1980 these had changed to 61.9 and 58.7 percent respectively. College aspirations for seniors in the general and vocational curriculum increased by 10 percentage points while those for seniors in the academic curriculum increased by 3 percentage points.

There were fewer study aids in the homes of 1980 seniors than in the homes of 1972 seniors. The average number of study aids (a place to study, reference materials, newspapers and books and a typewriter) decreased from 3.21 in 1972 to 2.97 in 1980.

Student Behaviors and Attitudes

There were major changes, between 1972 and 1980, in the curriculum track of high school seniors as well as in the number of courses they took, the amount of homework they did, their extracurricular activities, and their educational aspirations and plans. There were also changes in student attitudes and values.

More seniors were enrolled in the general or vocational curriculum in 1980 than in 1972, while fewer students were enrolled in the academic curriculum. Students in the academic curriculum decreased from 45.7 percent of all seniors in 1972 to 38.1 percent in 1980. Seniors in the general curriculum increased from 31.8 percent of all seniors in 1972 to 37.2 percent in 1980. The shift into the general curriculum was greater for males than females and occurred primarily among White students.

Seniors apparently took fewer semesters of social studies, science and foreign languages in 1980 than in 1972, but also took more semesters of mathematics. The average number of semesters of social studies declined from 5.21 in 1972 to 4.64 in 1980 and the average number of semesters of science declined from 3.71 to 3.46. Students took considerably less foreign language (2.64 semesters in 1972 and 1.65 in 1980). The average number of semesters of mathematics increased from 3.93 in 1972 to 4.06 in 1980. However, these changes should be interpreted with caution. In 1972, coursework information was obtained from students' schools; in 1980, students supplied this information. An examination of the validity of student responses in 1980 by NCES showed that the quality of student reports on amount of coursework varied by subject area and among subgroup populations.

Seniors reported doing less homework in 1980 than in 1972. The estimated decline was from approximately 4.55 hours of homework per week in 1972 to 4.05 hours in 1980. Students in the general curriculum and the vocational curriculum contributed most to this decline. The proportion of general and vocational seniors reporting doing less than five hours of homework per week increased from 74.3 percent in 1972 to 85.1 percent in 1980, while the proportion of academic students reporting this level of homework increased from 53.9 percent in 1972 to 59.3 percent in 1980.

Student participation in non-academically-oriented extracurricular activities increased from 1972 to 1980 while participation in activities that could provide an opportunity for nonformal learning declined.

There was little change in the mean level of education to which students aspired. This finding, however, masks both sex differences and a considerable shift in the type of postsecondary education sought. Educational aspirations declined for males but increased for females. The percentage of seniors aspiring to four or more years of postsecondary education decreased from 50.6 percent in 1972 to 45.5 percent in 1980.

The proportion of seniors aspiring to junior college or voc-tech education increased from 30.6 percent in 1972 to 34.8 percent in 1980.

Seniors' actual plans for the first year after high school differed somewhat from their aspirations in both years. There was an increase, from 25.9 percent to 29.5 percent, in students planning to work full-time. Plans to enter four-year colleges rose from 32.6 percent of seniors to 35.3 percent, while plans to enter junior colleges or voc-tech programs declined from 25.6 percent to 20.3 percent.

The largest group of seniors aspired to a professional occupation at age 30 (45 percent in 1972 and 43.4 percent in 1980). There was a decline in males aspiring to a professional occupation but female interest remained stable.

The attitudes and values of high school seniors also changed between 1972 and 1980. Interest in correcting social and economic inequities declined, while interest in making money and in job success increased. Students became more self-confident between 1972 and 1980 but less sure of their ability to control the course of their own lives.

Test Score Change

There were declines on all three achievement tests between 1972 and 1980. The largest declines occurred in vocabulary and reading. The typical senior in 1980 (a student at the 50th percentile in 1980 in vocabulary and reading achievement) would rank at about the 41st percentile among the 1972 seniors in both vocabulary and reading. Similarly, a 1980 senior with average mathematics achievement in 1980 would be at the 45th percentile when compared with the 1972 seniors. When these changes are measured in standard deviation units, the declines are .22 for Vocabulary, .21 for Reading, and .14 for Mathematics, indicating a greater decline in verbal than in quantitative skills. (See Table 1.)

Vocabulary

Females showed a greater decline than males on the Vocabulary test. Whites showed greater declines than Blacks and Mexican-Americans, but these comparisons may be confounded by test score floor effects. The decline for Whites was relatively pervasive, cutting across SES levels, geographic regions, curriculum type, and school type (public vs. Catholic).

Reading

The decline in Reading test scores tended to be somewhat more consistent across subpopulations than the Vocabulary test scores. Declines were relatively consistent across sex, SES, curriculum type, and school type, but Whites showed a greater decline than Blacks or Mexican-Americans. The Reading test score declines were found primarily among students who reported doing less than 5 hours of homework per week.

Table 1

NLS/HS&B Test Score Changes, 1972-1980

	Vocabulary				Reading				Mathematics			
	1972	1980	Diff.	Change in S.D. Units	1972	1980	Diff.	Change in S.D. Units	1972	1980	Diff.	Change in S.D. Units
Sex												
Male	6.44	5.90	-.54*	-.14	9.83	8.95	-.88*	-.17	13.79	12.83	-.96*	-.13
Female	6.67	5.69	-.98*	-.26	9.95	8.96	-.99*	-.20	12.09	11.39	-.70*	-.10
Race/Ethnicity												
White	7.08	6.24	-.84*	-.23	10.56	9.60	-.96*	-.20	13.95	12.98	-.98*	-.14
Black	3.28	3.20	-.08	-.03	5.94	5.56	-.38	-.09	6.50	6.69	.19	.03
Mexican-Amer.	3.47	3.50	.03	.01	6.28	5.60	-.69	-.15	8.02	7.54	-.48	-.07
Curriculum												
Academic	8.29	7.62	-.67*	-.18	11.99	11.33	-.66*	-.14	16.66	16.17	-.49	-.08
General	5.32	4.83	-.49*	-.15	8.48	7.71	-.78*	-.16	10.41	9.89	-.52*	-.08
Vocational	4.70	4.15	-.55*	-.18	7.51	6.81	-.70*	-.15	8.78	8.48	-.31	-.05
Acad. Curriculum by Sex												
Acad. Males	8.04	7.81	-.23	-.06	11.77	11.52	-.25	-.05	17.26	17.18	-.08	-.01
Acad. Females	8.56	7.56	-1.00*	-.27	12.23	11.31	-.92*	-.20	16.00	15.47	-.53*	-.09

*Statistically Significant Difference

Mathematics

The decline in Mathematics test scores was slightly larger for males than for females and larger for Whites than for other racial/ethnic groups. Blacks showed a small, but not statistically significant, increase in Mathematics test scores. The Mathematics test score declines were found primarily among students who reported doing less than 5 hours of homework per week. Females and Blacks who reported doing more than 5 hours of homework per week showed significant increases. The largest score decline was among male students who took four or fewer semesters of mathematics and/or science.

Comparison with SAT Score Decline

NLS/HS&B scores for women in academic programs declined more than scores for their male counterparts in Vocabulary, Reading and Mathematics. (See Table 1.) This differential decline reversed the lead that academic women had in 1972 on NLS Vocabulary and Reading tests, and increased the lead that academic men had on NLS/HS&B Mathematics tests.

SAT scores for men and women declined in a somewhat similar pattern in the same time period. As shown in Table 2 below, men had a slight lead in SAT verbal scores (454 vs. 452) and a large lead in SAT math scores (505 vs. 461) in 1972. Between 1972 and 1980, the women declined somewhat more than the men on both scales, increasing the discrepancy between men and women.

Table 2

SAT Test Score Changes, 1972-1980

	Verbal				Mathematics			
	1972	1980	Diff.	Change in S.D. Units	1972	1980	Diff.	Change in S.D. Unit
Male	454	428	-26	-.23	505	491	-14	-.12
Female	452	420	-32	-.29	461	443	-18	-.17

Factors Affecting Test Score Change

While the preceding section on test score change describes the relationship of individual variables to test score change, this approach does not lend itself to evaluating the impact of any one given variable or a set of variables while controlling for the effects of other numerous confounding variables. Therefore, a "step down" analysis of covariance was used to estimate how 1972-1980 changes in population demographics, student behavior, school characteristics and home educational support systems separately affected the average score decline. Path analysis was employed to ascertain if certain subpopulations, which were characterized by larger declines, might have experienced different educational processes in 1972 than their counterparts in 1980.

The results show that:

- Shifts in population demographics from 1972 to 1980 were a minor factor contributing to the score decline.
- Changes from 1972 to 1980 in student school behaviors and in school characteristics played the major roles in the score decline. This finding was consistent across all three tested achievement areas.
- Student school behaviors and school policies contributed equally to the vocabulary score decline.
- School characteristics played a somewhat larger role than did student school behaviors in the reading score decline.
- Conversely, student school behaviors played a slightly greater role in than did school characteristics in the mathematics score decine.
- Changes from 1972 to 1980 in the home educational support system were in a direction that would resist score decline. However, the magnitude of the effects of changes in home educational support were quite small compared to student and school characteristics.

Changes from 1972 to 1980 in individual student school behaviors that contributed most to the score decline, in approximate order of importance, were:

- Reduced semesters of foreign language courses. This reduction was proportionately greater for females.
- Reduced number of hours of homework. This reduction was proportionately greater for females.
- Reduced number of semesters of science courses.
- Reduced number of students in the academic curriculum.

Changes from 1972 to 1980 in individual school characteristics that contributed most to the score decline, in approximate order of importance, were:

- o An increase in the proportion of students rating the school as needing more academic emphasis.
- o A decrease in school means with respect to homework done by students.
- o A decrease in school means with respect to semesters of foreign language courses taken by students.
- o An increase in schools with a high dropout rate.
- o A decrease in school means with respect to laboratory courses taken by students.
- o A decrease in students' rating of their school's reputation in the community.
- o A decrease in students' rating of the quality of their academic instruction.
- o A decrease in students' rating of the physical condition of their school buildings.

Most changes from 1972 to 1980 in the educational influences in the students' home resisted the score decline:

- o An increase in fathers' educational level.
- o An increase in mothers' educational level.
- o An increase in mothers' educational plans for child.

However, the number of study aids in the home decreased and may have contributed to the decline.

Taken together, these findings suggest that the major factor contributing to test score decline was a decreased academic emphasis in the educational process. The impact of this shift in emphasis fell primarily on White and on upper and middle class students, however. Federal and state programs designed to strengthen basic skills in reading and mathematics appear to have prevented comparable score declines among low socio-economic status Blacks in Vocabulary and Reading and to have contributed to the score increase among this same group in Mathematics.